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ZOOLOGICAL NOTES FROM NATAL.

By Alfred D. Millar.

(Plate I.)

A Monstrous Ray or Devil-fish.—In April, 1898, a crowd was seen on the sea-shore at Durban, drawn together by the interesting object represented in the accompanying Plate (I.), a reproduction of a photograph taken by Mr. Burn, of the Natal Drug Company. Some Indians were fishing with their net on the sea-coast when they discovered that something unusually large had come within their grasp, whereupon these men, with great excitement, quickly drew the net shorewards, and, as the waves receded, an enormous Eagle Ray, with its single young, was disclosed to view. The captors smartly fastened ropes to their prize, and anchored it to the shore, gradually drawing it out of the water, but with considerable difficulty.

The measurements taken of this fish were 14 ft. 6 in. across the disc, 6 ft. from head to root of tail, and with a tail 6 ft. in length. In order to turn this enormous creature to be photographed on its reverse side, no fewer than twenty natives were required, thus giving some idea as to its weight, which was roughly estimated at about 15 cwt.

Although several of these monsters have been observed disporting themselves about Durban, this is, I believe, the largest, if not the only specimen of its kind that has been landed on our shores, and it is now preserved and contained in the Durban Museum.

[This is not the first time that attention has been called to these gigantic fishes in the pages of this magazine. In 'The Zoologist' (1849, p. 2358), the late Edward Newman gave an account by Capt. Hamilton of the capture of a specimen in the Gulf of California, which measured nineteen feet across the back. For this unidentified species Mr. Newman proposed the provisional name of *Brachioptilon hamiltoni*, which by Jordan and Evermann, in their 'Fishes of North and Middle America,' is placed as a synonym of *Manta birostris* (Walbaum). This fish, generally recorded under the name of *Ceratoptera vampyrus*, attains a width of twenty feet. Gosse, in referring to this animal under the generic name of *Cephaloptera*, gives a sensational narrative:—"Col. Hamilton Smith, in the neighbourhood of Trinidad, had the pain of witnessing a fellow-creature involved in the horrible embrace of one of these monsters. It was at early dawn that a soldier was endeavouring to desert from the ship by swimming on shore. A sailor from aloft, seeing the approach of one of these terrific fishes, alarmed the swimmer, who endeavoured to return; but, in sight of his comrades, was presently overtaken, the creature throwing over him one of its huge fins, and thus carrying him down." The same writer also gives the following extract from a Barbadoes paper:—"On the 22nd of August [1843] the brig 'Rowena' was lying in La Guayra Roads, the weather perfectly calm. I discovered the vessel moving about among the shipping. I could not conceive what could be the matter. I gave orders to heave in, and see if the anchor was gone, but it was not; but, to my surprise, I found a tremendous monster entangled fast in the buoy-rope, and moving the anchor slowly along the bottom. I then had the fish towed on shore. It was of a flattish shape, something like a *devil-fish*, but very curious shape, being wider than it was long, and having two tusks, one on each side of the mouth, and a very small tail in proportion to the fish, and exactly like a bat's tail. The tail can be seen on board the brig 'Rowena.' Dimensions of the fish were as follows:—Length from end of tail to end of tusks, 18 ft.; from wing to wing, 20 ft.; the mouth 4 ft. wide; and its weight 3502 lb." ('The Ocean,' pp. 193–4).

According to Prof. Seeley, the Ox Ray, or Sea-Devil (*Dicerobatis giornæ*) has been captured in the Mediterranean, 28 ft. wide and 21 ft. long, and estimated to weigh a ton. Mr. Lydekker has stated that an Indian representative of *Dicerobatis* is known to measure 18 ft. across the disc, and a weight of over 1200 lb. has been recorded.

Mr. Boulenger (Ann. & Mag. Nat. Hist. ser. vi. vol. xx. p. 227, 1897) has described a new genus and species from Jamaica, allied to *Ceratoptera* (*Ceratobasis robertsii*). The specimen was a young one, but the species is said to grow to a very large size; "but specimens are almost impossible to obtain, owing to the superstitious fear of the fishermen."

The species here figured probably belongs to the genus *Dicerobatis*, but as dentition principally separates that genus from *Cephaloptera*, absolute certainty cannot be obtained from a photograph alone.—Ed.]

An Antelope protecting its Young.—There are many instances recorded in which animals have displayed remarkable courage in the protection of their young, and they will frequently expose themselves to imminent danger, though this is common alike

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in the higher as well as in the lower orders of animal life. An interesting incident was observed whilst Snipe-shooting at Claremont, near Durban, on the 1st November last. My pointer-dog started a young Reed-buck (*Cervicapra arundinum*), and immediately gave chase. The little buck was apparently but a few days old, and rushed off frantically in the long grass; but the dog soon gained ground, and was just about overtaking it, much to my regret, when the little buck, fearing capture, started bleating. This gave warning to the mother, who, watching us approach, had remained concealed in cover only eighteen inches in height. Immediately the bleating was heard, a fine doe Reed-buck rose within one hundred yards from us, and rushed off gallantly to rescue her young. The dog, not noticing the doe, was in hot pursuit, and within a yard or two of the little fawn, which in a few moments must have fallen to its pursuer. The doe now rushed at full speed, answering her little one's call in a deep guttural note, and, on overtaking the dog, deliberately jumped over it, and whilst in the air kicked out with her hind legs. The dog fell, but whether from fright or through being kicked over—probably the latter—I was unable to detect; however, be that as it may, the dog was so startled at such an incident that he immediately pulled up, and stood staring in wonderment, whilst the mother proudly cantered off with her young, a sight that any sportsman would delight to see.

STRANGE MESSMATES.—In October last I had occasion to watch a pair of Black Saw-winged Swallows (*Psalidoprocne holomelæna*), in order to discover their nest, and was soon rewarded by seeing one of the birds suddenly disappear in the ground carrying grass. On approaching I found a deserted hole of an Ant-bear,* into which the Swallow had gone. These birds frequent the holes of Ant-bears in preference to an embankment when nesting, and the reason may be readily understood when it is seen what protection is thus afforded against their many enemies. Having observed that the bird was then only constructing its nest, I decided to revisit the spot shortly afterwards, when, to my surprise, I found that the Ant-bear had returned home to his old haunt, taking up his abode inside. The ground being much disturbed, with the hole partly closed, it struck me that the Swallow would not return; consequently I determined to dig down to the nest. Entering the excavation head first, I soon found a small hole about two inches in diameter leading upwards about three feet from the entrance. I started burrowing, when the first thing discovered was a spherical white egg recently deposited on the bare ground. This was identified as the egg of the Natal Kingfisher (*Ispidina natalensis*), the clutch usually consisting of four eggs; and, on going a short distance further in the same hole, I came across the Swallow's nest, with a clutch of three small pure white elongate eggs, the nest being constructed wholly of minute grass-tufts. Both the Swallow and Kingfisher had made use of the same entrance. The Ant-bear I did not attempt to burrow after, this being a task usually ending in fruitless results, as these curious animals can dig faster than any two individuals provided with spades.

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* Ardvaark (*Orycteropus capensis*).

A Curious Deposit of Eggs.—For some time past a pair of Brown-hooded Kingfishers (*Halcyon albiventris*) have frequented my garden, but I was unable to locate their nest. At last, however, I came across one of the birds carrying a grasshopper, which at once led me to understand I was too late, and that the birds were feeding their young. They had nested in the bank of a pit, as is their wont, generally penetrating into the earth about three or four feet. Down this pit an old ladder had been left projecting several feet above the pit's mouth. About a week later, when revisiting the spot, to my surprise and delight I observed four large round white eggs lying on the ground immediately below one of the bars of the ladder, from which the eggs had evidently been dropped. The bird, having young in its nest, was apparently on the horns of a dilemma; it was useless depositing her eggs with the young, and hence the bird quietly disencumbered herself of the superfluous eggs in this easy but somewhat remarkable manner. The clutch of this bird consists of four round eggs, the shells being very thin, while the newly-laid egg has a salmon tint, the yolk reflecting through; but when the egg is blown it becomes pearly white. October is the nesting season.

NOTES ON THE BIRDS OF BELGIUM.

By O. V. Aplin, F.L.S.

I spent a few days in June, 1898 (2nd—10th), in the valley of the Meuse, staying at Dinant, and exploring the main valley from Houx up to Givet just over the French frontier, and parts of the beautiful valley of the Lesse up to Houyet. As the distribution of birds on the European continent has not been very minutely worked out for English readers, a list of those that I saw may be worth printing in 'The Zoologist.' The valley of the Meuse about Dinant and about as far up the river as Hastière is generally narrow. In places the river is closely hemmed in by high ground, rising sometimes so abruptly as to form towering cliffs inhabited by numerous Jackdaws. At other places the high ground falls back, and leaves space for meadows, a stately *château*, a farm, or a village. Where the slopes are gradual their sides are covered with scrub wood of hazel, beech, oak, and juniper; and box and other shrubs clothe the broken parts of the cliffs, which are further brightened, except on their smoothest faces, by trailing ivy, yellow lotus, viper's bugloss, campion, marjoram, wallflower, hawkweed, and rock-rose. Fine plants of blue columbine form an attractive feature on stony banks, while the stinking bear's-foot (*Helleborus fœtidus*), only a doubtful native with us, grows in profusion. Above the valley stretches a rolling, rather bleak arable country, with some resemblance to parts of the Berkshire downs, save that it is ruled here and there with long lines of roadside poplars and pines. Villages nestling among orchards and paddocks are frequent, and the country waved with rye and corn, and was sweet with sainfoin and trefoil. Above Hastière the heights sink away, and the valley spreads out into rich wide meadows, corn fields and orchards, varied by some wooded rising ground. This part of the district is very favourable for many kinds of small birds; at that season it was looking its best, the hawthorns and some late apples in bloom, and the flowery meadows more sweet with the scent of clover than any I had ever noticed elsewhere. Winding valleys leading from the main one penetrate the high-lying land, their sides thickly clothed with woods of oak, elm, ash, and hazel, with alder in the bottoms by the streams, and varied by birch, rowan, beam, and the lines of spruce firs where the roads cut through the woods. The wild and winding valley of the Lesse, with its rapid river now flowing under spreading branches at the foot of wooded slopes, dashing over boulders or washing the base of some cliff, like that on which the Château Walzin is perched; now passing more peacefully through little meadows where the high ground falls back and leaves space for farms and orchards of apple, walnut, and cherry, is not easy to get about in; like all the wooded valleys and scrub-clothed heights, it abounds in Nightingales. I went to Houyet in order to walk through the Royal Forest of Ardenne (now, I believe, turned into a game preserve for the inhabitants of the hotel, once a royal palace) by the glorious road which winds with bold sweeps to the high ground at Sanzinne (about 260 metres). The forest is of oak, birch, hazel, some beech, a kind of elm, ash, and some patches of spruce. Very fine spruces line the road; the undergrowth is very thick, and there is a fair number of large trees. The forest clothes the sides of a valley rising rather steeply from a tiny stream. Where the stream widens out into ornamental water near Houyet, swarms of Edible Frogs (*Rana esculenta*) were holding high carnival; and on the stony banks of the road, as elsewhere, Lizards were not uncommon on the side which caught the sun. I caught one in another part of Belgium, which appeared to be a brown form of *Lacerta muralis*. It escaped in my garden here; and I turned up another (the green form), bought in London, to keep it company.

Some of the birds which I did *not* see in the district are worth remarking upon; for although I may have overlooked some of them, others are, from their habits in early June, so conspicuous, that I do not think I could have failed to detect them had they been present, or present in any but very small numbers. I failed to see the Missel-Thrush, Redstart, Lesser Whitethroat, Long-tailed Tit, Nuthatch, Spotted Flycatcher, Pied Flycatcher, Goldfinch, Corn Bunting, Rook, and Kestrel. The Missel-Thrush might have been present, for at that season, with young flown, it is rather a quiet bird. The Nuthatch also becomes much quieter at that season than it is in the spring; I have seen it in October in the woods about La Roche, some thirty miles to the eastward. And the Long-tailed Tit is not usually numerous enough for one to make sure of seeing it during a search of only ten days' duration. The Rook seems to be anything but generally distributed on the Continent. The Kestrel certainly could not have been otherwise than scarce; I expected it would be common about the cliffs. But I hardly think I could have overlooked the other six species. The conspicuous Pied Flycatcher, which to all appearance would have been exactly suited by the hanging woods coming down to a dashing river and orchards in the Lesse valley, is so local in its distribution that one must never wonder at *not* finding it. But I was astonished not to see the familiar grey friend of our gardens. Gardens there were in abundance, but I did not see a single Spotted Flycatcher in the district; at all events it must have been rare, for its ways make it conspicuous. When staying a few days at Mechelen, later on, I found it in the Botanic Garden there. The Common Redstart would not easily be overlooked, but I did not see it in Belgium; though *R. titys* was common. The Goldfinch—conspicuous alike in plumage, song, and call-note—I did not meet with; and the Corn Bunting—which one would at first expect to find enlivening the high-lying, open arable land with its skirling song—remained true to its character of a curiously local bird by shunning the land. But, on considering the matter, I remember that there is an absence of low hedges and walls, as of tall thistle and dock, on this well-cultivated field, so that the Corn Bunting would have no suitable perch whereon to alight after one of those wobbling flights which it delights to take, with its legs dangling. Woodpeckers were scarce. I never saw either the Spotted or Barred (the former I saw once at La Roche in October); and though I occasionally heard a *Gecinus*, I could not even decide for certain upon the species. The Ring Dove and Stock Dove were both scarce; the former curiously so.

Turdus musicus.—Here, as in some other parts of the Continent, a shy forest or woodland species. Three were singing in the upper part of the Forest of Ardenne; and another on the wooded slope of the valley of the Molignée about Montaigle.

T. merula.—Its haunts are similar to those in this country; common.

Saxicola œnanthe.—A pair on high, open ground, near Sanzinne (about 800 feet), perched several times in young walnut trees and an apple tree in an orchard. I saw a female about a marble quarry close to the Meuse below Dinant.

Pratincola rubetra.—Numerous in the meadows along the Meuse, some way above Dinant.

P. rubicola.—Quite common along the Meuse above Dinant; perhaps drawn away from the bushy hillsides and cliffs by the railway and telegraph wires. Also seen in a bushed gorge leading up from Bouvigne.

Ruticilla titys.—Common, and generally distributed in suitable localities. It is quite a house-bird, frequenting even considerable towns; and during this visit to Belgium I only twice saw it away from buildings. In one case an old male sat on a projecting rock on the cliff face a long way from any houses; in the other, a male was perched on a dead branch of a low bush in the middle of the refuse bank at a marble quarry. In Givet three were singing; one of them from the steeply-pitched roof of the church in the middle of the town. At Hastière one sang from the roof of the old inn; and another from the new brewery chimney. At Hermeton-sur-Meuse, a farm—with its odoriferous cowhouses and yard deep in manure, which it loves so well—had its pair, for each pair seems to have its allotted location, and does not, in the country at least, often admit of very near neighbours. When dwelling in a town amid a waste of steep roofs of all sizes and pitched at all angles, they are rather less exclusive. Stately *château*, vile modern villa, and humble white-walled cottage are alike favoured by this most domestic bird. It dearly loves one of those typical Ardenne villages like Houyet; or long, straight, one-streeted Sommière, where the cowhouse can hardly be distinguished from the owner's green-shuttered dwelling, and the doors of each are alike and side by side, while a rude ladder conducts the hens to a hole in the wall; almost every house is provided with a midden-place in lieu of a front garden, the manure neatly supported by a low wall or a wattle fence. All this results from the almost universal plan of house-feeding the cows, and is to the advantage of the Black Redstart, for flies and other insects swarm. The male occasionally, when flying from one spot to another, finishes its flight with wings thrown up and tail somewhat spread. Seen thus against a dark background it is a pretty object, the red tail being very conspicuous. Although more than one male was located within easy earshot of my bedroom window in Dinant, it was only in the very early hours of the day—before the dog-carts and trolleys and long, narrow country carts began their frightful rattle and din on the sharp-edged rough stones with which the streets are so vilely paved—that I could hear the song well. But if you are awake at dawn, while it is yet too dark to see the birds, you can hear the song to perfection. The song of one bird, written down there, was sometimes "chy wy wy wy wy (quickly) chee e eo," or "chich wich wich tich (quickly) itchyty (confused and internal) cheeo weo dee" (clear and sweet). It is, perhaps, the crystal clearness and brightness of the song, with its rather shrill tone, which makes this pure, sweet song carry so far. And it is this characteristic purity and clearness which constitutes its individuality. It is probable that two broods of young may be reared by some pairs. On June 4th full-fledged young sat with quivering, hardly fully-grown tails, on a heap of ancient stones piled up in an angle between the Norman church and the wall in the neglected churchyard at Hastière.

Erithacus rubecula.—A good many seen and heard in the woods; also some in the gardens at the back of the Casino at Dinant, which include a piece of the steep wooded rocky hillside.

Daulias luscinia.—Could be heard from the hotel at night and early in the morning; haunted the Casino gardens and the rest of the wooded cliffs at the back of Dinant, and all possible localities. In the woods it was abundant, and really rather a nuisance sometimes when one was trying to listen to other birds. I listened in one wood to a babel of sound produced by three Nightingales, a Garden Warbler, a Robin, a Chiffchaff, and a Chaffinch, all singing at once, and not far apart. Some young birds were probably hatched by the 3rd, as I heard the sharp "whit" and the croak from one anxious pair, and the croak from others. Nightingales could often be seen on the roadsides, and were wonderfully tame.

Sylvia cinerea.—Not very common.

S. atricapilla.—In the woods and Casino gardens, &c. The song of some birds seemed exceptionally fine and powerful.

S. hortensis.—Common in the woods, and noticed on the wooded slopes. In fine rich song.

Regulus cristatus.—Appeared to be tolerably common in spruce firs.

R. ignicapillus.—I had a good view of a bright male in a spruce by the side of the road passing through the Forest of Ardenne. It looks rather a longer bird than the last, and is very quick in its ways.

Phylloscopus rufus.—Common in woods, gardens, and wooded cliffs.

P. trochilus.—On the 3rd I noticed several in song in a wooded part of Lesse valley near Walzin; but it was not observed elsewhere.

P. sibilatrix.—In the Forest of Ardenne there were two or three about some oak trees, and I listened for some time to the curious "chit-it-tit-titereeeeeee," beginning rather slowly and going into a trill. There was another in song in a little oak wood by the Lesse at Houyet.

P. bonellii.—I had a long interview with a pair of Bonelli's Warblers in the Bois de Roquet, near Dinant. The male sang often. The song is a quick, rapid outburst, louder and fuller than a Wood Wren's, but shorter, and with no preliminary slower syllables. It might be lettered "chititereee"—a short outburst, shorter and more rapid than the Lesser Whitethroat's, which it somewhat resembles, but than which it is less loud and metallic. A call-note (that of the male) I noted down on this occasion as a kind of "creech creech creech," followed by one or two sharp little notes, only sometimes heard. I first became acquainted with this curious note in the high-lying cork and oak forest on the spurs of the Atlas in western Tunisia. It puzzled me greatly at first; but finally I shot a male in the act of uttering it. I find that at that time I noted it down as the call of the male, consisting of five notes, and rendered it thus: "aych aych aych chit chit." The pair I saw near Dinant frequented some oak trees, and came low down, so that I got good views of them. Bonelli's Warbler is a coldly-coloured little bird when seen against fresh, young green leaves, and at a little distance shows no yellow tints. The range of this little bird in Central Europe does not appear to be fully worked out at present.

Hypolais icterina.—I met with about half a dozen birds in wooded places, a wood, and a garden. The song is marvellously varied, and the variations seem endless; short phrases are tried over three or four times sometimes, long ones only once: the song is a running one to this extent. It is a very remarkable and striking song, but I do not think it is a fine one, the notes being usually very harsh, and wanting in mellowness and melody. In the space of a quarter of an hour, during which the bird sang continually, I could detect no mocking of other birds. There is a characteristic sound about the song of this bird (shared in some degree by at least two others of the genus *Hypolais*) by which you can recognise it at once; but the bird is sometimes easy to see when you have once made out its greenish-yellow tints against the foliage, and you can note its orange mouth and throbbing throat. Here are some phrases I took down from the song of the bird just mentioned:—"ts'quairk (grating and twangy) tisk tisk; sik sik sik, kik kik kik (high and shrill); tsairk (low and quavering like the cry of young hawks) poo-it poo-it; pit-it pit-it pit-it; tip tip tip; ti-op ti-op; pitch-it pitch-it; kip kip kip care; it-care it-care; ik-waya ik-waya; too-ay, too-ay too-ay; it-tay it-tay it-tay it-tay; wik wik zay" (three times over).

Acrocephalus streperus.—Two or three at some pools near Givet (see below); and one singing in a willow bush on the banks of the Meuse at Houx.

A. turdoides.—Just below Givet, in some flat grassy waste land, there are some large pools, perhaps partly formed by digging material for banking in the river (which is locked). The pools are partly grown up with thick beds of reeds, flags, and other water plants, and thickets of willows of two or three species,—some bushes eight or ten feet high. As I approached the pools, and was still at a considerable distance from them, I was attracted by some notes of a peculiarly guttural song, and as I drew nearer I had no doubt that here was one of the birds I was hoping to meet with. Here I found these great Warblers in some numbers, and listened to perhaps half a score or more in the limited space I explored. The place was a veritable stronghold for the birds, as, in the absence of a boat, one could not hope to reach a nest, or indeed get very close to the birds. But the loud croaking song could be listened to easily, and could be heard from afar. Not much less conspicuous were the birds themselves, with their dull brown upper parts, reddish-brown tail, and whitish under parts (the contrast between the colours of the head and back and the tail is not very obvious in dried skins, but it is remarkable in the living bird), for they often perched on an upper willow twig, quite high up, or on a flag or reed stem in an open spot. The Great Reed Warbler sits, when singing, in a very upright position, with the point of its bill raised, the bill open as it sings, and the throat throbbing and swelled so that the small feathers part, showing their dusky bases, and the bird appears almost to possess a dusky gular spot. It is a restless, bold, and noisy bird at this season, and often takes flight from bush to bush. The song is very remarkable. The likeness of some notes in it, in character, to those of a Frog is very striking, although they do not exactly resemble those of any kind of Frog with which I am acquainted. The bird's notes are chiefly grating, and often have a guttural tone. These are some notes and phrases which I wrote down:—"Gurk gurk gurk; gurruck gurruck gurruck; ick ick ick ick; gik gik gik (shrill and squeaky); ajik ajik ajik; jirp jirp jirp ik ik; garra garra geek (last note high, and the g hard); gak gak karry karry (the last two notes high). Two or three Reed Warblers (*Acrocephalus streperus*) sang in their leisurely way in some of the thicker willows. Edible Frogs (*Rana esculenta*) in great numbers croaked their loud harsh grating cries, or splashed noisily into the water from spots where they had been sunning themselves. On the grassy land between the pools and the Meuse several Blue-headed Wagtails ran after insects, or rose with their plaintive "wich-ooo" or "wich-eee" as I passed. Sedge Warblers, haunting the ditch below the river bank, contributed their hurried song, and a few Sky-Larks and Whinchats made up the bird-life in evidence, although visions of small species of the genus *Porzana* and some more secret Warblers made me long for a boat and a week's search of the reed-beds and lush vegetation of the pools, over which a small species of dragonfly darted and hovered in numbers. I did not find the Great Reed Warbler in any other locality in the Dinant district, but met with it near Mechelen.

A. phragmitis.—Pretty common along the Meuse, especially above Hastière. Often to be seen singing on the wing, flying up high into the air also and then descending singing into a low tree or bush. I could not detect the Aquatic Warbler.

Accentor modularis.—I only saw two; one near the railway at Agimont, the other singing from the top of a roadside spruce in the Forest of Ardenne. Here, as in Switzerland, it does not seem to be the familiar garden bird it is with us. Later on I met with it, however, in the Botanic Garden at Mechelen.

Parus major.—This widely distributed species was on the whole the commonest Titmouse; there were fully fledged young at Houx on the 9th.

P. ater.—I met with some in the Forest of Ardenne, and a pair in the valley of the Lesse near Walzin.

P. palustris.—Seen in the same localities, and in about the same numbers as the last named species.

P. cæruleus.—Frequently seen; almost as common as the Greater Tit.

Troglodytes parvulus.—Frequently seen; Forest of Ardenne, Casino gardens, &c.

Certhia familiaris.—Seen once.

Motacilla alba.—Common. Young broods were on the wing, and, as I could only see these and old males (at least I could not see a bird which looked like a female), I imagine the females were sitting on second clutches. White Wagtails were especially common by the Meuse below Hastière; they often flew about half-way across the river with a dancing flight, about a foot above the surface of the water, to catch flies, and then returned to sit on the road, the low stone posts, or the iron protecting rail.

M. flava.—There were many Blue-headed Wagtails all down the Meuse from Givet, but they were commonest in the wide meadows above Hastière. Some hawked flies over the river, returning to perch near the spot they started from; they usually hawked higher in the air than the White Wagtails. These Wagtails perched habitually in the willows and the young fruit trees planted along the path by the river. A male without a tail had a most extraordinary appearance.

Anthus trivialis. — Fairly common; about the edges of woods, &c.

Oriolus galbula.—I heard the note of this bird in the Bois de Roquet.

Lanius collurio.—I saw four males and one female. A male flew past one day with a cockchafer in his bill. Having settled on a bare branch, he put the chafer under foot and devoured it piecemeal, giving two or three harsh notes of satisfaction at the finish.

Hirundo rustica.—Not very numerous, and far less so than the next species.

Chelidon urbica.—Abundant. All up the Meuse from Namur, as we approached Dinant on a wet evening, the House Martins were conspicuous over the river, and they were numerous at Dinant, and about a large farm in the Lesse valley. In Givet they were in some numbers, and bred unmolested in the corners of windows, as well as under the eaves. In these towns there are not the swarms of Sparrows that we have. A crowd of Martins were collecting mud at a small pond at Sanzinne, and the same day we found them swarming in Houyet, a typical Ardenne village devoted to cows. It is quite a pleasure to see any number of Martins, for it is some years since I have seen a building well decorated with nests in England.

Cotile riparia.—A small colony in a shallow sand-pit near Agimont. As they were common over the Meuse about Dinant, I supposed that some bred in holes between the stones of the built-up river banks, and other supporting walls where roads had been cut out, for I saw no sandy places in the immediate neighbourhood. Yet all day they skimmed low over the water, and they haunted the river more than either Swallows or House Martins.

Ligurinus chloris.—Seen occasionally.

Passer domesticus.—Did not swarm as with us.

P. montanus.—Seen about young apple trees at Agimont; a pair near Houyet, and others in a garden there. The Tree Sparrow appears to be rather a common bird in Belgium.

Fringilla cœlebs.—Common; in the roadside trees in the

Forest of Ardenne, for instance. Many are kept caged in towns and villages, and sing very loudly; all that I examined were blind. The Chaffinch here sings a long and good strain. The first part is long, although usually rather sibilant; the second part is loud and full. The fact that the song of the Chaffinch differs (more or less) in different districts was remarked upon long ago by Humboldt, who, writing of the Canary of Montaña Clara, says:—" The note of these birds varies with their flocks, like that of our Chaffinches, which often differs in two neighbouring districts " ('Personal Narrative,' vol. i. p. 39).

Linota cannabina.—Common about bushy cliffs and box-clad gorge, as well as by the river.

Pyrrhula europæa.—I met with a pair in a wood bearing the curious name of Bois de Froide Veau (so in the map), and another in the valley of the Molignée.

Emberiza citrinella.—Seen about the arable land, and bushed gorge above Bouvigne.

E. schœniclus.—One by the Meuse.

Sturnus vulgaris.—A few near Dinant.

Garrulus glandarius.—Two in the Forest of Ardenne, one of which was making a queer attempt to sing, or rather to chant.

Pica rustica.—Occasionally seen.

Corvus monedula. — Numerous; they haunt, among other places, the cliff under the Château Walzin, various bare cliffs along the Meuse, the old Norman church at Hastière, and the ruins of the Château Montaigle, on an isolated rock rising straight from the Molignée.

C. corone.—Seen about the cliffs and wooded heights along the river, and in the Forest of Ardenne.

Alauda arvensis.—Fairly common on the open arable land, and some near Givet.

Cypselus apus.—A fair number about Dinant, and Swifts were to be seen about high cliffs here and there between that place and Givet. In Givet the Swift was the ruling species, and abundant.

Iynx torquilla.—Heard twice in the distance.

Gecinus ——?.—I heard several times the note of a Green Woodpecker in the woods and forest, but never saw the bird. On some occasions the laugh seemed deep in tone, as if it proceeded from *G. canus*, but this is uncertain.

Alcedo ispida.—One crossed the Meuse with a silvery fish crosswise in its bill.

Cuculus canorus.—Common. On one occasion three in close company crossed a road leading through a wood.

Syrnium aluco. — The remains of one lay by the roadside in a wood.

Athene noctua.—On two occasions I heard what I believe was the note of this bird, in woods.

Buteo vulgaris.—In the Forest of Ardenne I watched one soar up out of sight; saw another mobbed by Crows, and heard the wailing cry on two occasions.

Columba palumbus.—Strangely scarce; two only seen flying along wooded heights across the river.

C. œnas.—One in the distance flying along a wooded slope at Houyet.

C. livia.—I saw a bird exactly resembling a wild Rock Dove about some river cliffs far from any (visible) house.

Turtur communis.—Several in woods.

Phasianus colchicus. — Heard several times in the Bois du Séminaire and the Forest of Ardenne.

Perdix cinerea.—I saw birds twice, once on the high ground at the back of Dinant, and again near Sommière.

Coturnix communis.—I heard a Quail calling from a field gay and sweet with sainfoin and yellow trefoil on the high-lying arable land above Bouvigne.

Ægialitis hiaticula?.—I saw a bird flying in the distance over the pools at Givet, which appeared to be a Ringed Plover.

From the 10th to the 14th of June I was at Mechelen, in the flat rich Flemish country. I made a list of the birds I saw, and it may be worth giving shortly. Those species marked with an asterisk were not met with about Dinant. The sandy land around Mechelen is very highly cultivated, and corn-fields, varied by many acres devoted to the cultivation of asparagus and other vegetables for the great *marché* of Mechelen, stretch away as far as the eye can see. But the country is well wooded with lines of poplars and plantations. There are grass marshes along the tidal, embanked Dyle and elsewhere, and willow and alder along the drains. But the country is densely populated, and a few hours' drive over the paved roads takes you past numerous little villages and scattered houses, cheerfully adorned with red roofs, white walls, and green shutters. It was not therefore surprising to find that resident birds were scarce. The numerous population of small cultivators may account for the scarcity, as well as for the fact that you may probably see in Mechelen more carts drawn by dogs than in any other town.

Turdus merula.—In the Botanical Garden.

Pratincola rubetra.—Some in the grass marshes.

P. rubicola.—A pair carrying food on the bushed banks of a fortification.

Ruticilla titys.—Several seen in Mechelen (49,000 inhabitants), on the houses; one in the Grande Place.

Daulias luscinia.—Heard in all the small plantations, and about country houses; I saw and heard several in the Botanical Garden.

Sylvia cinerea.—Fairly common.

S. atricapilla.—Plantations and Botanical Garden, where it was in very fine song.

S. hortensis.—Appeared to be common in plantations.

Hypolais icterina.—One heard to the north of the town; another haunted the Botanical Garden. I heard a few rather good notes from this bird, and a regular screech once or twice; but I had no opportunity of listening to it well on account of a brass band and a crowd of people interfering on one occasion, and a cold grey morning on another.

**Acrocephalus palustris ?*—A bird singing, but out of sight, in a patch of tall rye bounded by a wet ditch and garden ground, was probably a Marsh Warbler. I heard imitations of the notes of Swallow, Whinchat, and Stonechat, with Nightingale-like notes and low chattering notes.

A. turdoides.—I heard the grating notes from some reeds and willows some way off on the other side of the Dyle. At a fortification to the north of the town there was a moat, of which I could get an occasional glimpse from the road. There I heard two or three of these Warblers, and caught sight of one. I did not think it desirable to poke about the place much with glasses and note-book!

Accentor modularis.—Seen once or twice in the Botanical Garden.

Parus major and *P. cæruleus.*—Occasionally seen.

Troglodytes parvulus.—About gardens, several times.

Motacilla alba.—Saw a few. In the Botanical Garden was the only adult female, so far as I could judge, that I saw in Belgium. It had the crown sooty mixed with grey.

**M. melanope.*—To my great surprise, I saw a black-throated Grey Wagtail sitting on a bare twig over a piece of water in the Botanical Garden. A tidal creek, or branch of the Dyle, bounds the garden on one side.

Anthus trivialis. — Seemed fairly common about wayside poplars.

Oriolus galbula.—I heard the note in a wood near the Château Rubens. One bird (and I think another also) was singing in the thickest parts of the tall trees which stand round the Botanical Garden. I moved it more than once, and at last got the glass on a male as it flew out. It is far from a conspicuous bird when seen against a background of fresh green, and moreover it is loth to leave the thick foliage. Its sweet rich "lit-a-vool" or "lit-a-vool-ee" was, I think, followed by some low chattering notes, heard only on two occasions, when I was just under the place where I thought the bird was sitting; but I could never see it when it was perched.

Lanius collurio.—One male.

**Muscicapa grisola.*—Several about the Botanical Garden.

Hirundo rustica.—In fair numbers.

Chelidon urbica.—A few only compared with some places.

Passer domesticus.—Not conspicuously abundant.

P. montanus. — Saw a good many. Some seen about pollard trees, and several times dusting by the roadside. Apparently rather a common bird in Belgium.

Fringilla cœlebs.—About gardens and wayside trees.

Emberiza citrinella.—Fairly common by the roadsides. Some males were very bright, as at Dinant also.

E. shœniclus.—Several along the high banks of the tidal Dyle; also about reeds in the grass marshes, and along a canal.

Sturnus vulgaris.—Common about grass marshes, &c. Some were in flocks; others inhabited St. Rombaut's great tower. Seen in Antwerp.

Pica rustica.—Several times seen by the wayside.

Corvus monedula. — Inhabited St. Rombaut's Tower and the Botanical Garden. In the Zoological Gardens at Antwerp I saw a pair of white Daws with pink legs and bill, and white (ordinary?) irides.

C. corone.—Two or three seen.

Alauda arvensis.—A few seen one day.

**A. cristata.*—On a large open bare sandy piece of ground outside Mechelen I saw a Crested Lark (very much the colour of the soil), which was beating some prey against the ground. When this Lark is alarmed its long crest stands up. I was glad to hear again its call-note "sweet-a-weet," or "weeta," or "seee weet weet." Another bird was singing, flying about in a desultory way, going a little way, and then pausing to sing its very sweet song (with a variation of the call-note) with beating wings; then dropping away down wind, to bear up again presently, and repeat the performance. So the song is often interrupted by flights. The big bill of the Crested Lark is conspicuous, as also is the light, bright brown in the tail when the bird flies up.

Cypselus apus.—Swarmed in great numbers round the huge cathedral tower (St. Rombaut's, 324 ft.). They could be heard from our windows screaming faintly, apparently at a vast height, after 9 p.m., when it was almost dark. In the evenings they swarmed in the air round the tower, and also about a large building looking like a factory; there were fair numbers all about the town and in the vicinity. In few other towns have I seen Swifts in such numbers.

Gecinus ——?.—A Green Woodpecker (apparently *G. viridis*) heard in a plantation.

Columba palumbus.—Several about plantations.

Turtur communis.—Several about plantations.

FECUNDITY IN EACH AVINE SPECIES, VARYING ACCORDING TO ACCIDENTS OF LOCALITY.

By Basil Davies.

In a former article I attempted to describe how the peculiarities of any species might cause its reproduction to differ from that of another: it is now my purpose to describe, if in a somewhat partial and incomplete manner, how the members of a single species may differ *inter se* as regards this function, because of the more or less favourable circumstances under which they may happen to breed. The possibility, and, later, the certainty of these differences and their origin, was early brought under my notice, seeing that for several years I alternately resided in the bleak and smoky outskirts of a northern manufacturing town, and on the edge of some of the richest land in the fertile western counties. I have also to thank Mr. W. Storrs Fox for supplying a little evidence upon my present subject in his kindly criticism of last month.

My ornithological books early informed me that a Hedge-Sparrow laid from four to six eggs, yet near my northern home I never found a clutch to exceed two; and so scant was the insect-life of the neighbourhood that a year would occasionally pass without my finding a single nest of the species. I personally have notes of many completed clutches of two, and a friend's voluminous diary can only furnish three clutches exceeding that number during a continuous residence of several years in the same district. In Gloucestershire, however, five was the usual number, and a nest of six occasioned no remark. In Lancashire the lingering winter, combined with a foul and smoke-polluted atmosphere, rendered insect-life nowhere abundant. In most English localities you may rely on retaining a pair of "resident" birds to breed with you during the summer, if you mark them frequenting your fields and hedgerows in the latter end of March; but at R—— the birds would weary of waiting for the tardy spring. By means of some agency in the bird-world, corresponding, I suppose, to our daily press, they would hear of lovely nesting weather in Derbyshire; and to me March's promise brought but regrets in May. Even when insectivorous birds were few and far between, nature's providence forbade the laying of a full clutch, clearly evidencing the sparseness of the food-supply. Near Clifton I have often found six Hedge-Sparrows' nests containing the full clutch within the bounds of a single field, without regard to Chiffchaffs and Whitethroats catering for hungry families on very similar lines.

My favourite authorities would further inform me that the Sand-Martin is accustomed to lay from four to six eggs in its solitary clutch year by year. My notes of expeditions in the south and west confirm this rule, giving five as the common number, and four as the minimum. There rises before my vision a northern colony of this river-haunting bird. I see a miniature amphitheatre of oozing clay, its lofty sides dotted with Irishmen wielding spades and encroaching yet farther on the plateau-like meadow-land above; where we expect the arena is a loathsome clay-pool, slimy brown and forbidding, destitute of reed or flag. One side of the encircling banks has ended abruptly in a sand-wall, and here the Martins have found a home. The birds are flitting over the clay-pool, actually *struggling* for each rising fly. The meadows they will resort to towards sunset. The land is too poor to breed the humble fly; there are on it only the tiny moths which sleep by day among the blades and grass roots. On Aug. 10th, 1896, I examined seventeen nests in such a place as this, and no nest contained more than three eggs or young.

If we transport ourselves to some shelving sand-bank on some southern stream, we see the Martins flitting about careless of each other's prey. A warmer temperature and the vegetation plenteous in the stream-bed render insect-food abundant, and every tunnel in the wall's face will give to light five or six young Martins before September comes.

It is a great help in bird study to acquaint oneself with gamekeepers. One vacation I was trespassing, countenanced by the head keeper, and I found two Sparrow-Hawks' nests in woods three or four miles apart. Each contained the magnificent clutch of seven eggs, forming a picture none the less delightful because I had no desire to "collect" them. I resolved to tell the keeper of the unusual discovery, although I expected him to grumble because I had not destroyed them. To my surprise he was well pleased. He told me how his master had caused all the Hawks on his estate to be slain as far as was practicable, with the exception of an occasional pair in woods lying remote from each other. He desired to protect his coverts, but, like a true sportsman, he could admire a stately bird in mid-air; consequently a pair was suffered to nest here and there undisturbed. These orders, the keeper continued, had been in force some ten years, and the clutches of surviving pairs had each year increased from the time when he had received orders to destroy as many as possible. There were now remaining some three or four pairs of Sparrow-Hawks on the whole estate. The Kestrels had been exterminated. He had frequently found clutches of six of late years, and on rare occasions the larger number of seven. This certainly appears to point to the conclusion that increased scope for foraging results in increased fecundity.

The Yellowhammer is an excellent example of my point. After a long correspondence in the 'Feathered World,' Mr. John Craig, of Beith, and one or two others began to collect statistics regarding the usual number of eggs deposited by this Bunting in one nest. Mr. Craig himself showed that in Ayrshire a clutch of three was normal; this county consists largely of sheep-farming land, and alternates between rather thin close-cropped grazing-ground and furze-clad moorland, foliage and herbage being nowhere luxuriant. In a western English county I obtained sufficient evidence to show that five was there the usual clutch; while a Cheshire friend stated that four was usual in his neighbourhood, five and three being of less common occurrence. Cheshire, as regards fertility, comes about half-way between the two extreme instances previously cited. It possesses a tolerably productive soil, bearing a reasonable proportion of woodland and thick ground herbage.

To speak on broader lines, I everywhere found large clutches in the west and small clutches in the north. I well remember one afternoon with the birds of Somersetshire. The ground we traversed was a large plain, moist, loamy, and dark-soiled, intersected by numerous rhines, fences, and hedgerows. Nests were everywhere abundant, everywhere cramful of eggs, and all species seemed to be adequately represented. Nearly every nest we examined contained the maximum clutch permitted by book-writing authorities, and in some cases the legitimate number was exceeded, the most notable instance, perhaps, being that of a Whinchat incubating seven eggs. Indeed, the wit of the party remarked that the prescribed maximum had been passed in the case of every nest we had found, save that of the miserable Cushat-Dove, which had merely deposited the regulation couple.

THE COLORATION OF BRITISH BIRDS AND THEIR EGGS.

By W. Storrs Fox, M.A., F.Z.S.

Some three years ago I made a rough table of the coloration of British birds and their eggs. I did this for the benefit of a local Naturalists' Club. Last year I had reason to revise this table. As I do not know of the existence of anything on quite similar lines, it has struck me that it may be of interest to some of the readers of 'The Zoologist.'

In dealing with coloration it stands to reason that there cannot be one law for birds found in the British Islands, and another which applies to those inhabiting the rest of the world. But, being more familiar with our own birds, I have drawn my illustrations from them almost entirely. I believe that the principles laid down in this paper are of universal application, and that the interest attached to them will not be lessened by the fact that the examples given are taken from a small group of islands.

The introduction to the second volume of Seebohm's 'British Birds' consists of an account by Mr. Charles Dixon of the protective colour of eggs. The subject is there dealt with at some length. Dr. A. R. Wallace, when treating of the coloration of birds' eggs, refers to that "valuable work."* Mr. Dixon has collected a number of very interesting facts, and everyone interested in the subject ought to read his account.

It will be seen from the two following tables that certain general principles govern the colours of both birds and their eggs. There are, however, some very awkward exceptions to the rule. Perhaps someone will throw light upon these difficulties. When it is clear that eggs are usually protectively coloured, it is strange that we ever should come across any which lack such protection.

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* 'Darwinism,' p. 214.

So also with the birds themselves, it is difficult to see why the cock Song-Thrush should be protectively coloured, but the cock Blackbird conspicuous on account of his intense black plumage. I am not aware that the former assists in incubating the eggs, and that the latter does not perform any such office. It is obvious that certain birds have little or no need of protectively coloured plumage. Some are naturally protected by their size and strength, *e.g.* the Swan; others by size combined with gregarious habits, as the Rook and Heron; or, by these defences combined with great powers of diving, as the Cormorant and Guillemot. Birds, except very small ones, which nest in holes can dispense with protective colours. It may fairly be said that the position and structure of the nests regulate the colouring of the birds themselves as well as their eggs, and that wherever there is no special need for sombre shades of plumage, conspicuous or bright hues prevail.

I. Of birds which make *open nests*, either (*a*) both sexes are protectively coloured; or (*b*) the hen so coloured and the cock more showy.

It will be readily seen that small birds, and birds frequenting very exposed places, specially need protection. It is such birds which have both sexes protectively coloured, *e.g.* Song-Thrush Hedge-Sparrow, Lark, smaller Game-birds, Rails, Plovers, Sandpipers. Certain species of the last-named group have the sexes different.

That the hen should be sombre but the cock conspicuous is not surprising in large birds, such as Ducks and the larger Game-birds. But in a less degree it holds good also in the case of many small birds, such as the Blackbird, Blackcap, Wagtails, some of the Finches, and Buntings; but in all these (except the Blackbird) the colouring of the *upper parts* tends to harmonize with their surroundings.

Among the Plovers and Sandpipers the Dotterel (*Charadrius morinellus*) and Phalarope (*Phalaropus hyperboreus*) may be mentioned as exceptional, for with them the female is more brightly coloured than the male. The explanation lies in the fact that these males perform the duties of incubation.

Most sea-birds are equally showily coloured in both sexes. They nearly all have pure white under parts, which strongly contrast with the grey or black of their upper parts; as, for instance, Terns, Auks, Gulls, Divers, Grebes.

Here it must be pointed out that (1) parts of plumage which are never displayed are dull-coloured; (2) parts which are out of sight when the birds are at rest, but which appear during flight, or under excitement, are often ornamented with beautiful colours or patterns. Examples may be found among Pheasants and Sandpipers. Conspicuous marks exposed during flight possibly act as danger signals* Probably *all* such showy colours and patterns are made use of in courtship and in battle.

The larger Gulls take three or four years before they attain to mature plumage. The plumage of quite young Gulls is sombre. The stages through which they pass before arriving at maturity are supposed to be recapitulations of former states of colouring.†

II. Birds which *nest in holes.*

As a rule, both sexes of such birds have conspicuous plumage; as Woodpecker, Kingfisher, Sheldrake; and, among foreign birds, Parrot, Toucan. But small birds, such as Tits, Nuthatch, are much less brightly coloured than larger ones.

There are some noticeable exceptions to this rule. In the case of the Wheatears and Redstarts, the hens are sombre in colour, and the cocks much more striking looking. According to my own experience of *Saxicola œnanthe* and *Ruticilla phœnicurus*, they place their nests quite out of sight. I have very little acquaintance with the other members of these genera, but, so far as I can gather, the nests of some species are usually quite hidden, whereas those of others may be as much open to view as are many nests of the Pied Wagtail. Is it possible that with our common Wheatear and Redstart the sombre hues of the hens' plumage date back to a time when the nest was always more exposed to view?

The Wryneck and many of the Petrels are also exceptions, as both sexes are clad in dull-coloured garb. I know of no satisfactory explanation.

III. All British birds which build *covered nests* have both sexes alike, and are sombre in colouring. They are small defenceless birds, such as the Wren, Willow-Warbler, and Dipper.

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* Newton's 'Dictionary of Birds,' p. 101; Wallace's 'Darwinism,' pp. 217–226.

† Newton's 'Dictionary of Birds,' p. 100.

IV. Nocturnal birds, *e.g.* Nightjar, Owl, have plumage which will conceal them during the day. At first sight the Barn Owl would seem to be an exception, but this species is much more retiring than most of the others, and hides away entirely out of sight.

V. The usually dull colours of the Accipitres may help these birds to escape the notice of their prey. Such an explanation is not very satisfactory, as they do not sit still and wait for their prey to approach them. But, as these birds are well able to take care of themselves, they might be expected to have bright-coloured plumage.

There are certain individual cases which are very difficult to explain:—

(*a*) Why is the common Swift (*Cypselus apus*) such a sombre-looking bird?

(*b*) Does the Cuckoo (*Cuculus canorus*) really *mimic* a Hawk? There are other members of this family which appear to mimic species which are not allied to them.

(*c*) How is the Egret (*Ardea garzetta*) protected? It is not large, and has pure white plumage. Is its beak a sufficient means of defence?

(*d*) Ruffs (*Machetes pugnax*) are adorned with variously coloured plumes about the neck. They go through a form of battle for the Reeves. Such characteristics are contrary to the rule of the family (*Scolopacidæ*) to which they belong. By way of explanation, Darwin* states that the males of this species are probably polygamous.

(*e*). The plumage of the hen Oriole (*Oriolus galbula*) and the Jay (*Garrulus glandarius*) is quite bright enough to be conspicuous. But they nest among the thickest foliage.

Just as the coloration of birds' plumage falls naturally into divisions depending upon the nesting habits of the species concerned, so also may their eggs be grouped on similar lines. And moreover, the less important divisions also correspond in both cases. But when we are considering eggs laid in open nests, it is necessary to remember that such nests are nearly always partially covered by overhanging leaves and branches, by a projection of rock or stone, by thick herbage, or by sedges and long grasses. This fact will often account for the deeper or paler shades of egg-colouring.

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* 'Descent of Man,' ch. viii.

I. Eggs laid in *open nests* are coloured.

(*a*) The ground colour of those laid in trees and bushes is often some shade of green or blue marked with brown, red, or black, *e.g.* Thrushes, Finches, Crows.

(*b*) When the nest is placed very low down amongst herbage, or when it is placed in a covered site, the ground colour of the eggs is paler, and so are the markings, which are sometimes greenish, *e.g.* Redbreast, Wagtail, Whitethroat; but not so the Pipits.

(*c*) When exposed to some extent on the ground they are generally clay-colour, or brown, or greenish brown, spotted and blotched with a darker shade, or even with black, *e.g.* the Lark, Lapwing, Curlew, Gulls.

(*d*) Certain birds, as Ducks, Partridge, Grebes, cover their eggs when they leave the nest. Such eggs are usually white or of a pale tint. This might be expected, as the protection of colour is in such cases unnecessary.

(*e*) Large birds which are able to defend themselves may be expected to be capable of keeping their eggs safe from the attacks of Crows, &c. Swans and Cormorants will come under this head.

II. Birds which *nest in holes* nearly always have white eggs, *e.g.* Swift, Woodpecker, Kingfisher, Puffin, Petrel. But very small birds so nesting generally lay white eggs speckled with red.

The only exceptions which occur to me are the Wheatear, Redstart, Starling, Jackdaw, and Chough. The first two of these have already been dealt with. I have no personal knowledge of the Chough. But there is some reason to suppose that nesting in holes is a comparatively recent habit both with the Starling and the Jackdaw. In 1887 I found two Starlings' nests which were "open." One was at the top of a spruce-fir, built upon an old Wood-Pigeon's nest; the other was in ivy. Perfectly fresh-laid Starlings' eggs differ very much, varying from a decided blue to nearly white. Jackdaws sometimes lay their eggs in hollow trunks, where they can be seen from above.

Moreover, I have a note to the effect that near Eyam, in 1887, some Jackdaws were nesting among the branches, after the manner of Rooks. In the 'Naturalists' Journal' (vol. vii. No. 72, June, 1898) a similar occurrence is recorded.

III. When birds build *covered nests* the eggs are white, spotted finely with red, black, or brown, *e.g.* the Wren's, Chiffchaff's, Swallow's; or pure white, *e.g.* the Dipper's. The House- and Tree-Sparrows are exceptions.

IV. *Nocturnal birds* lay white eggs, as the Short-eared Owl; or nearly white, as the Nightjar. Protective colouring is not needed in such cases, as the birds sit on their eggs throughout the day.

V. The eggs of the Accipitres are safe under the parental guardianship. They are pure white, white slightly spotted with red, or boldly blotched with red, or in some cases the ground colour is entirely hidden by the overlying red.

Here again the exceptions to the rule present great difficulties. Some of them are interesting enough to have attracted the attention of Dr. Wallace and Prof. Poulton.

(*a*) All the breeding habits of the Cuckoo are strange and abnormal. Until more is known about them we cannot hope for a satisfactory explanation of the variability of its eggs.

(*b*) It is a surprising fact that the Wood-Pigeon, which makes an open nest, lays pure white eggs. Dr. Wallace* and Prof. Poulton† give the following explanation:—They suggest that the egg is white as a protection *from below;* that the Wood-Pigeon builds a flimsy wicker nest, through the bottom of which the eggs can be seen; but that, being white, they are inconspicuous against the blue sky. [Dr. Wallace expresses it rather differently. After remarking that light may be seen through the nest from below, he says:—"It is a difficult matter to discover, from beneath, whether there are eggs in the nest or not, while they are well hidden by the thick foliage above."] It seems hardly possible that this is the true explanation. Wood-Pigeons' nests are not always of the wicker type; and, if it is an advantage for the eggs to be unnoticeable from below, the natural course for the birds to take would be to build solid-bottomed nests always. Nor has it yet been proved that a white egg *is* less conspicuous from below than a coloured one. Mr. Beddard has shown that white is not invisible from below,—that a snowflake, when seen against a blue sky, looks black. If the colours of eggs have any meaning, they are obviously a protection against marauders *above* the nest. It is not usual for eggs laid in open nests to be white, even when dense foliage overhangs them. The eggs being white and the nest so flimsy, it might be supposed that until recently these birds built in holes. But the fact that by far the majority of the members of this great family (*Columbidæ*) —which embraces some three hundred species—does not nest in holes is a very strong argument against such a theory. These birds lay but two eggs, and often begin to sit as soon as the first egg is laid. In this way the need of colour would to some extent be obviated.

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* 'Darwinism,' p. 213.

† 'Colours of Animals,' p. 62; *cf.* also Beddard's 'Animal Coloration.' p. 115.

(*c*) Lastly, we must turn our attention to the *Alcidæ*. The eggs of the Common Guillemot display an extraordinary variety in ground colour and markings. Dr. Wallace* and Mr. Dixon† suppose that this is due to their being laid on inaccessible cliffs, and thus completely protected from enemies. If this is the correct explanation, it seems strange that the eggs should be coloured at all. But a visit to Flamborough Head in the breeding season will show that these eggs are not safe from all marauders. These cliffs are tenanted by Jackdaws as well as by Guillemots. And that the former have a taste for the eggs of the latter is evident, for the shells of sucked eggs may be seen lying about on the top of the cliffs. Prof. Poulton‡ believes that a more feasible explanation is that all this variety of colouring enables "each bird to know its own eggs." But, if this is necessary in the case of Guillemots' eggs, how do Terns and Gulls, which nest together in such dense numbers, dispense with a similar provision? Most of the eggs of any one species are very much alike, and are so difficult to see that the greatest care must be taken by anyone visiting their nesting stations in order to avoid treading on them.

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* 'Darwinism,' pp. 214, 215.

† Seebohm's 'British Birds,' vol. ii. p. xxvii.

‡ 'Colours of Animals,' p. 213.

The Razorbill also lays its eggs on precipitous rocks, but they are placed under cover. Though the markings vary to some extent, the ground colour is generally white, sometimes brown. The Puffin's eggs are laid far down a hole, and they are pure white. When they are fresh and clean faint traces will be found of those bold markings which are so common on the eggs of the *Alcidæ*. Do not these suggest that long ago the Puffin laid coloured eggs in the open, after the manner of its cousin the Guillemot at the present day?

I hope that these remarks will draw out criticisms and observations from your readers, and that thus the difficulties of the subject may to some extent be cleared up.

WHAT IS THE REASON OF THE GREAT VARIATION IN CUCKOOS' EGGS?*

By Dr. E. Rey, Leipzig.

Translated and communicated by W. Wells Bladen, Vice-President, North Staffordshire Field Club.

Among the many attempted explanations of the great variation to be found in the colouring and markings of Cuckoos' eggs, the application of the Darwinian theory of selection seems at first sight to be most feasible. But on closer examination it does not appear to be in accordance with many well-founded facts. This theory supposes that those female Cuckoos whose eggs most resemble those of the nest chosen, have greater chance for the preservation of their offspring than others, whose eggs would be more liable to be destroyed by the foster-parents. As it may moreover be presumed that their daughters would lay eggs similarly coloured, and would make the same selection of nests for their offspring as their mothers, the consequence would be a preponderance of females whose eggs are similar to the nest eggs in colouring, whereas the other class would become more rare, and finally disappear.

I have already demonstrated in my work on the Cuckoo, and am now able to confirm by material at my disposal, and by nearly 2000 examples, that eggs matching those of the foster-parents are only to be found in a small percentage of cases. Those who only take into consideration the few examples in which Cuckoos' eggs are coloured like the nest-eggs, would alone venture to ask that the theory of selection should be accepted; whereas others, who consider the question in its entirety, will reject it as untenable, as far as the Cuckoo is concerned.

If the resemblance of its eggs to those of the foster-parents were such an advantage to the Cuckoo it would not be found as an exception to the rule, but would, on the contrary—at least here in the neighbourhood of Leipzig—be very perceptible in connection with *Lanius collurio*, most Cuckoos' eggs (84 per cent.) being found in the nests of these birds; of 282 Cuckoos' eggs found in the nests of the Red-backed Shrike, only sixteen, about 5 per cent, were of the type of *Lanius* eggs.

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* "Was ist der Grund für die grosse Variabilität der Kuckuckseier?" Ornith. Monatschrifte des deutschen Vereins z. Schutze der Vogelwelt. Jahrgang 1895. Nr 1.

Quite irrespectively of this, how would it be possible to explain, by means of the theory of selection, the fact that there are a great number of Cuckoos' eggs which have a particular type of colouring not to be found in any eggs known to us, and others marked like eggs with which eggs of the Cuckoo are seldom placed. We must therefore cast about for another explanation. In a number of species of birds we see that the eggs differ considerably in colour and marks when they come from places far apart. To quote a few examples: eggs of *Phylloscopus trochilus* from Lapland are, contrary to those found in our parts, marked with dark spots, so dark as almost to be mistaken for eggs of *Phylloscopus rufus.* Again, whilst spotted eggs of the Redstart are rare here, examples are frequent in high northern latitudes; and whereas *Caccabis saxatilis* lays distinctly spotted eggs in the alpine regions, its eggs from Greece are monochromous, or but very slightly marked.

Now, as Wickmann has demonstrated that eggs take their colour from the transposing products of the blood, so must we lead back the varieties of colouring to the variety of these transposing products, and the latter again to the chemical or physical properties of the blood. We must look upon food as the chief cause of the difference in the formation of the blood, for according to its different chemical properties it will produce lesser or greater variety in the composition of the blood. We must therefore take, as the cause of the variation in the colouring of the eggs of the same bird from different places, the difference of food according to the place of their residence. Not that different nourishment would produce an immediate change in the colour of the eggs—for we know that every female bird will, during its whole life, unless pathological changes should occur, lay the same, or at least very similarly, coloured eggs—but the difference in food will, in the young female bird, whilst the body is developing, have an abiding influence upon its blood-forming organs, and determine the colour of her future eggs. It is clear that apparently similar food can produce different results, for we often see that insects and larvæ, externally alike, have, chemically, quite different bodies; and, again, quite distinct insects are chemically alike.

If, on the one hand, the variation in the eggs of different female birds of the same species is occasioned in this way, the law of heritage confines it on the other. We see that Shrikes and Pipits lay very different eggs, but notwithstanding the number of varieties there is a decided type running through them all. Here we see a certain inherited resemblance, whereas in other cases the eggs are so completely distinctive as to be unrecognizable. If we apply this to the Cuckoo, we are not astonished if almost every bird lays differently coloured eggs, because the difference of food arising from the various foster-parents, according to their kind and individuality, produces a much larger variety than in other birds. And if we further apply to the Cuckoo the law of heritage, over and above the difference in food, the variation in the eggs would be enormously increased. Considering the manifold variety thus produced, it is quite possible that the eggs of the Cuckoo should assume a likeness to the eggs of other birds, even of such as it does not choose to lay with. We must also admit that the principle that the food of many birds, though it may not affect their own eggs, has its influence on the colouring of the eggs of their offspring, can also be applied to the Cuckoo, in the case also when it is nurtured for generations in the nests of the same species of birds whose eggs do not vary much.

We can, with some amount of certainty, assume that our Cuckoo, before he became a nesting parasite, laid monochrome blue eggs, as we see now in its near relatives the North American *Coccyzus americanus* and *C. erythrophthalmus*, which have already occasionally begun to give up rearing their own young. The blue eggs of the Cuckoo, exclusively found in the nests of the Redstart, which also lays blue eggs, may be traced to similarity of food and inheritance.

NOTES AND QUERIES.

MAMMALIA.

CARNIVORA.

Habitat of the Thick-tailed Mungoose (Cynictis penicillata).—According to the 'Royal Natural History' the Thick-tailed Mungoose inhabits the Cape Colony. Nothing is said about other parts of South Africa. As far as my own personal experience goes, *C. penicillata* also inhabits both the Orange Free State and the Transvaal. I have often seen and shot the animals on the Free State flats some miles north of Bloemfontein. Some time back I shot two examples of the same species about twenty miles north of Johannesburg, in the Transvaal. They are somewhat difficult to shoot, but, being spurred into a great desire of obtaining one for identification by the statement in the 'Royal Natural History,' I finally managed to shoot the two individuals above mentioned. I have their skins before me now. The one is of a brilliant orange drab on the back, fading into light yellowish grey on the flanks and under parts. The fur is finely speckled owing to the hairs being ringed with alternate black and amber-brown. The tips of the hairs are amber, and the roots white. The other example is of a greyish yellow colour, much lighter than the former. The fore feet of both have five toes, and the hinder ones only four. The tail is bushy, and has a white tip. There can be no doubt as to their identity. The question is, How far north do they extend? That I cannot say as yet.—ALWIN C. HAAGNER (Dynamite Factory, P. O. Modderfontein, Transvaal, South Africa).

[I procured a specimen of the Meer-Kat (*Cynictis penicillata*) near Pretoria in 1890, and recorded the same in my 'Naturalist in the Transvaal,' p. 159 (1892). This specimen I placed in the British Museum, which, Mr. W. E. de Winton informs me, is "still the only specimen we have with locality north of the Colony."—ED.]

White Stoat.—In the last issue of 'The Zoologist' (*ante*, p. 131), I observe the record of a white Stoat (*Mustela erminea*) from the North of England. About the 21st of November last I received a similar specimen from West Somersetshire (near Watchet), and, considering the mildness of the weather at that time, I was surprised at its appearance. It was pure white, except some regular light brown markings over each eye, looking much like eyebrows, and, of course, the usual black tail-tuft.—H. W. Marsden (40, Triangle, Clifton).

UNGULATA.

Zebra-Horse Hybrids.—I have just read, in the 'Bulletin de la Société Nationale d'Acclimatation de France' (October, 1898), the translation of the article published in 'The Zoologist' (1898, p. 49) on the hybrids of the Burchell Zebra and mare by Prof. J. Cossar Ewart. I have perused this memoir with much interest, because you will see by the publications I forward that I also have crossed the Zebra and mare. Until now I believed that I was the only one who had obtained this production, but by the article in question I see that I am not; and besides, my first production was born three and a half months after that of Prof. Ewart's—my first, Sordello, being born Dec. 5th, 1896, and Prof. Ewart's Romulus Aug. 12th, 1896. It is very curious to note that neither of us has known of the other's writings and ideas, yet have both carried into execution these experiments within a few months of each other. At this moment Prof. Ewart is the first in Europe, and myself the first in America, who have obtained these hybrids by crossing the Zebra with the mare, or, rather, other writings on the subject are unknown to me. I send you some photographs of my first two hybrids, but have not yet any of the others; but when I have will forward them to you. I am writing also to Prof. Ewart, and sending the same documents and photographs.

La Société Nationale d'Acclimatation de France has published, in its Bulletin of October, 1897, my account of "Le Croisement du Zèbre avec la Jument."

Dr. Fr. Steinriede published, in the 'Landwirtschaftliche Presse' of Berlin (Oct. 15th, 1898), an article with illustrations made from photographs of Zebra-Horse hybrids which I sent him.

The 'Journal l'Eleveur de Paris,' No. 726 (Nov. 27th, 1898), published a translation of a communication on the subject which I contributed to the 'Société Nationale d'Agriculture Brésilienne.'—Baron de Parana (Porto Novo do Cunha, Rio de Janeiro).

AVES.

Nesting of the Mistle-Thrush.—This bird (*Turdus viscivorus*) is much more common here than it used to be thirty years ago. On April 26th, 1888, I found a nest with four eggs, and the bird sitting on it, in a hole in the stone pier of a field-gate near Clogher Head, Co. Louth. The gate was often used, and the bird was sitting within six inches of it as it swung. There were plenty of high hedges and trees quite close. I consider this the most extraordinary and abnormal place I ever found a nest in. The year before (1887) I found a nest in the fork of a tall oak, and climbed up to it, as I wanted the eggs. It was ready for laying, but empty. I did not see the birds, but evidently they saw me, for two days afterwards they had moved the nest bodily to the next tree, where the hen was sitting on it. I was so touched by their intelligence that I left them in peace. On July 24th, 1892, I saw a curious Mistle-Thrush. It was pale dove-colour (a very pale grey) all over, and shone like silver in the sun. It was with about thirty others, and they stayed about the house for several days. I often got within forty yards of it, and watched it through a powerful glass. Its eyes seemed to be red. I have often seen Mistle-Thrushes, and heard them sing, in Fitzwilliam Square, Dublin, a somewhat curious habitat for such a wild bird.—G. H. PENTLAND (Black Hall, Drogheda).

Male Blackbird storing Seeds at Nest.—On March 21st I found, in a hedgerow, the nest of a Blackbird (*Turdus merula*), containing three eggs. On March 25th I again visited the nest, when I found the female incubating, and the side of the nest piled with a quantity of seeds, some of which I enclose for identification. On the 28th of the month I watched the nest from behind an apple tree, and saw the male bird come and go repeatedly, each time depositing these seeds, which are about the size of the half of a very small pea. His intentions were exceedingly charitable, and I should very much like to know if it is a common occurrence for the male bird of this species to feed the female during incubation, as I have never before observed him in this act.—STANLEY LEWIS (Wells, Somerset).

[The seeds are those of the common ivy (*Hedera Helix*).—ED.]

Blackbird's mimicking Notes. — I can corroborate Mr. Davenport's instance of the Blackbird (*Turdus merula*) imitating the Curlew. I find in my notes that on April 14th, 1892, I heard a Blackbird imitating a Curlew's whistle so perfectly that it at first completely deceived me. — G. H. PENTLAND (Black Hall, Drogheda).

Green Woodpecker in Ireland (Correction).—In Swann's 'Handbook of British Birds,' 1896, it is stated that this species (*Gecinus viridis*) had only twice been obtained in Ireland previously to October, 1889, "when an extensive immigration occurred." Again, Aflalo's 'Sketch of the Natural History of the British Islands,' 1898, speaks of a "recent immigration into Ireland, where, previous to the appearance of the last edition of Mr. Saunders's admirable 'Manual,' but two examples had been recorded." The above immigration never occurred, and neither edition of Mr. Saunders's 'Manual' is responsible for such a statement, as regards the Green Woodpecker. There were, however, ten Great Spotted Woodpeckers shot in Ireland in October, 1889, to January, 1890, inclusive: six in Ulster, two in Leinster, and two in Munster. This is referred to by Mr. Saunders. —R. J. Ussher (Cappagh, Co. Waterford).

Crossbill in North Wales.—Mr. Newstead (*cf. ante*, p. 28) will be interested to hear that two or three pairs of Crossbills (*Loxia curvirostra*) nested at Penmaenmawr, North Wales, in 1890 or 1891. I have lost my notes of the occurrence, but it was subsequent to 1889. I did not see them nesting myself, but my sister used to go and watch them, and I afterwards examined their nests. They were in some larch trees at a cottage in the lane which leads up to the Green Gorge, a well-known walk in Penmaenmawr. They were rather far out on the branches, and twelve or fourteen feet from the ground. My sister is a very good observer of birds, and she described them to me so minutely that there could be no doubt in the case. They were very tame, and she used to watch them from a distance of twenty or thirty feet, and could see their twisted beaks quite plainly.—G. H. Pentland (Black Hall, Drogheda).

The Eggs and Nest of the Moorhen.—I should like to add my mite of evidence to that of those who have already given theirs in favour of the view that the Moorhen (*Gallinula chloropus*) does not, as a rule, cover her eggs when leaving the nest. I have seen very many nests of the species under consideration, and I have never yet seen one in which the eggs had been intentionally covered over, and indeed I will go farther, and say that I have never met any collector or ornithologist who had. That the bird may occasionally resort to this means of protection is of course possible, but it is not its regular habit to do so, a fact about which the vast majority of observers seem quite agreed. — K. Hurlstone Jones, H.M.S. 'Repulse,' Channel Squadron.

Little Tern (Sterna minuta) in Ireland.—So far as I know there are only two regular breeding places of this bird on the east coast of Ireland, but in 1897 seven or eight pairs bred at the north side of the mouth of the Boyne, within eighty yards of the second hole of our golf-links. The caddies unfortunately found them out, and took, I fear, most of their eggs, for last year they did not reappear. I wonder if they went on to the Isle of Man, and formed Mr. Ralfe's colony (*cf. ante*, p. 32)? In the same year a Ringed Plover chose to lay her eggs near the twelfth hole of our links, and right in the course. Every ball from the twelfth tee whizzed over her head, and every player and caddy used to have a look at her four pretty eggs, but everyone spared them, and she hatched them out all right. There is a little islet in Carlingford Lough, called Green Island, where a few Arctic Terns breed. In 1886 I saw a couple of Lesser Terns (*Sterna minuta*) there, but could not find their eggs. In 1887 there were none to be seen. —G. H. Pentland (Black Hall, Drogheda).

Songs of Birds affected by Weather.—I was much interested in one of the Rev. W. Warde Fowler's observations in the March issue of 'The Zoologist' (*ante*, p. 135), for the somewhat quaint reason that it is irreconcilable with my own experience. I am such an admirer of Mr. Fowler's books that I feel a diffidence in taking exception to any of his statements, especially as he is known to be such a close and diligent observer of birds; but I am far from concurring with him in the opinion that "our resident species are not affected in any degree by the temperature *in regard to singing*." Speaking generally, for about a month previously to March 20th, Blackbirds, Song-Thrushes, Mistle-Thrushes, Starlings, Redbreasts, Hedge-Accentors, House-Sparrows, and Wrens had combined every single morning to enchant my ears with a most delightful vernal concert. Not only was their minstrelsy resonant and prolonged from daybreak until the morning was well advanced, but again, as the gloaming drew on, sundry of the eight species mentioned above would musically assert their claims to notice. On the morning of March 20th sixteen degrees of frost were registered here, and on the three following mornings upwards of twenty degrees were registered, snow falling on the Thursday (March 23rd), the day on which I am penning these lines. During these four days, neither in the morning nor in the evening has there been any singing whatsoever on the part of any one of the species, and the contrast, after the flow of song that was so strenuously maintained day after day during the balmy weather associated with the preceding weeks, is naturally brought out into the very boldest relief. Nor, I must admit, is this my most recent experience at variance with what has gone before. I still see all the species I have enumerated round about the house, but they appear in no mood to sing, nor do they. Whereof the cause? Surely, surely, the great fall in the temperature.—H. S. Davenport (Melton Mowbray).

The Covering of Eggs by Nesting Birds.—In connection with the discussion that has been carried on in these "Notes and Queries" as to the covering up of eggs by nesting birds, I may mention that I have noticed this done by Cormorants (*Phalacrocorax carbo*). In the end of May, 1895, I visited a colony of these birds on an islet off the coast of Sutherland. I took a photograph of a group of three nests which were placed side by side on the cliff. When we first approached the spot the birds flew off from the nests, leaving the eggs exposed to view; but, on returning to the same spot half an hour afterwards, after exploring the rest of the island, we found that in two cases the eggs had been covered up with reeds and grass, evidently with the intention of shielding them from observation.—H. C. Monro (Stratfield Saye, Hants).

Destruction of Norfolk Birds: a Rejoinder.—In 'The Zoologist' for March (*ante*, p. 114), I notice the following paragraph in connection with the increased scarcity of certain species of birds in the "Broads" district:—"To say nothing of what has been done to compass their destruction by a well-known dealer in birds' eggs in the West of England." As Mr. Gurney has since stated that this refers to me, I cannot allow a statement calculated to bring me into contempt with the better class of naturalists to remain uncontradicted. Of the six or seven species tabulated as having decreased so much, I have never asked for or received *a single egg from East Anglia,* except of the Bearded Tit. Of this species I did obtain a large number in one year (about 1885), but far more were sent me than I asked for or desired. I wrote to a correspondent in Norfolk for "a few sets," to which he replied by sending a large consignment, and though I wrote him at once to stop collecting, the birds must have been so common that even in the time occupied by exchanging letters he got a lot more. During the last ten years I have had almost no eggs from this district—possibly thirty or forty a year—comprising usually one, two, or three (three only one year) sets of Bearded Tits, and the rest Water Rails or a few common things. I was once offered a clutch of Garganeys, which I did not buy. These are the facts; I think any remark of mine is needless.—H. W. Marsden (40, Triangle, Clifton).

[No name was mentioned in the disputed statement of Mr. Gurney, who, however, has since frankly owned that he referred to Mr. Marsden. Under these circumstances, and at the request of both Messrs. Gurney and Marsden, the above note appears, though it is of a more personal than zoological character. This discussion is now considered as closed in these pages.—Ed.]

INSECTA.

Great Wood-boring Wasp (Sirex gigas) in Ireland.—I should be glad to learn if these insects are on the increase throughout the country. They first appeared here in 1893 or 1894, and now every fallen fir tree in my woods and nearly every paling and gate-post is riddled by them. I watched a female boring into a larch-post last summer for fully ten minutes, a most curious sight. She stood up on the tips of her toes, and stuck out her ovipositor at right angles to her body and into the bark of the post. Then she wriggled and worked very hard, but did not revolve as I expected she would, as the ovipositor has a regular screw like an auger at the end. I was foolish enough to grow impatient and catch her before she finished the operation.—G. H. Pentland (Black Hall, Drogheda).

NOTICES OF NEW BOOKS.

In the Australian Bush and on the Coast of the Coral Sea, being the Experiences and Observations of a Naturalist in Australia, New Guinea, and the Moluccas. By RICHARD SEMON. Macmillan & Co., Limited.

THIS is a very welcome translation of the itinerary and biological observations of a naturalist in—zoologically speaking—some of the most interesting regions of the world. Of the Malay Archipelago we have now a charming literature, which, we might say, was begun by Wallace, and has been continued since the publication of his well-known eastern travels. Of Australia we would fain know more. Its natural history early incited Bennett and Gould; Lumholtz has given us a good book; Saville Kent's recent work is well known; but the subject is far from exhausted. As Mr. Semon observes, Australia to the zoological explorer " will prove Eldorado, unequalled by anything else. For so singular are some aspects of the flora and fauna of Australia as to justify one in opposing the Australian region to all the rest of the world, and practical reasons only have prevented men of science from arranging their hand-books accordingly."

One great advance in the study of zoology is emphasized by the object-lesson of the modern travelling naturalist. The general *mise-en-scène* of tropical forests and coral seas is now familiar to the ordinary tourist and the most cursory reader; while the pure and simple collector holds a subordinate place in the estimation of naturalists, for men now travel across the globe to study the life-history of one animal form. Embryological studies in oviparous-mammals, and marsupials, and, above all, the developmental history of the " Australian lung-fish " (*Ceratodus forsteri*), which now inhabits but two small rivers of the east coast, were the main objects of Mr. Semon's visit to the Australian continent; and of *Ceratodus* in these pages we learn much, and more will be found in the author s strictly scientific publication, 'Zoologische Forschungsreisen in Australien und dem malayischen Archipel.' One observation on Termites is, however, too interesting to pass over. Our author was molested by the inhabitants of a big ant-hill near his encampment, and "strewed a handful of naphthalin crumbs all over the hill, in the certain expectation that this would occasion a general emigration." Conquering disgust, the Termites removed these objectionable deposits from their habitation. Pieces of potassic cyanide were now tried, and the expectation was held that by the morning the place would be deserted by the ants and their belongings. "How astonished was I when I found the whole surface of the heap strewn with dead ants like a battle-field. The pieces of cyanide, however, had totally disappeared! More than one-half of the community had met death in this desperate struggle, but still the death-defying courage of the heroic little creatures had succeeded in removing the fatal poison, the touch of which must have been just as disagreeable to them as it was dangerous. . . . Once removed from the heap, the poison had been well covered with leaves and pieces of wood, then interred, and thus prevented from doing further damage."

We have not space to follow Mr. Semon through the islands of the Malay Archipelago. As regards Celebes, he prefers the views of Max Weber to those of Wallace, and refuses to associate Celebes with the Australian region, believing its fauna to be an impoverished Oriental one, showing a strong Australian admixture.

The charm of these books lies in the philosophical treatment of natural history narrative, which not only gives us glimpses of exotic nature, but points to its signification.

Cambridge Natural History. Vol. IX. *Birds.* By A. H. Evans, M.A. Macmillan & Co., Limited. 1899.

We recently drew attention in these pages (1898, p. 510) to Mr. Beddard's 'Structure and Classification of Birds,' and if a companion volume is sought to be found to that work, Mr. Evans's book should come under that designation. One supplements the other, and most naturalists will probably place them side by side on their book-shelves for handy reference, in days when a zoologist is expected to know everything about something, and something about everything.

"In accordance with the scheme of the Series generally, the order followed runs from the lowest forms and the Ratite Birds upwards; the Carinate Birds being divided, after Dr. Gadow's plan, into two Brigades or Main Sections, and these again into Legions, Orders, and so forth." The contents of the book are practically an introduction to the birds of the world, and, although such encyclopædic completeness is impossible in a single volume, a distinct success has been achieved in referring to so many species within the confines of 587 pages. All these works have their strong points and their limitations. The first are found in the discriminative care by which a capable ornithologist sifts and rejects recorded narratives; the second inevitably postulates that much is necessarily overlooked. We should have been glad to see under the subject "*Struthio camelus*" some reference to Mr. Cronwright Schreiner's communication on this bird which appeared in our pages in 1897, and which we have read elsewhere, and, have also been told, corrected some previous misconceptions. Nevertheless we are thankful for a book that tells us so much in a small space, and the evident thorough work of the author is supplemented by the proof-readings of Mr. Howard Saunders and Dr. R. B. Sharpe.

One extract must be given; it expresses a fundamental truth little regarded in current zoological philosophy:—"It cannot be denied that Genera and Species are merely 'convenient bundles,' and that divisions of either, if carried too far, defeat the object for which Classification is intended. Genera are only more distinct from Species, and Species from Races, because the intervening links have disappeared; and, if we could have before us the complete series which, according to the doctrine of Evolution, has at some time existed, neither Genus nor Species would be capable of definition, any more than are Races in many cases; while the same remark will apply to the larger groups." This might well become the esoteric faith of every describer and monographist; most naturalists admit the truth of the doctrine, but specific and generic controversy is not yet a thing wholly of the past.

The Resources of the Sea, as shown in the Scientific Experiments to test the effects of Trawling and of the Closure of certain Areas off the Scottish Shores. By W. C. McIntosh, M.D, LL.D., F.R.S., &c. C. J. Clay & Sons.

This excellent contribution to the natural history of the sea is written to sustain a thesis, which is, that, granting man's unfortunate agency in the extermination of many land animals, his influence on the resources of the sea is infinitely small, almost practically *nil.* Last year (Zool. 1898, p. 376) we had the pleasure of giving extracts from a lecture by the Professor on that subject, and this book is a demonstration and exemplification on that theme. It is pleasant to find this bracing optimism in relation to at least one of Nature's realms. The enmity of the fisherman to the Star-fish, by "tearing them across the body before returning them to the water, only helped to increase their numbers, for each portion of the disc was regenerated and became a complete five-rayed Star-fish." In fact, "the survey of the sea and its inhabitants, therefore, in the main, affords no grounds for pessimistic views, but, on the contrary, conduces to reliance on the resources of nature (by which we mean Divine Providence) in this vast area." The deadly effects of the "trawl," as we have read elsewhere, on adult Sponges, Zoophytes, Star-fishes, Crabs, and Shell-fishes on the sea bottom is stated to be compensated by the fact that their larvæ and young are pelagic, and quite beyond the reach of injury. Even the "crushing and division of Sponges is not followed by the death of all the fragments, and each of those which survives is capable of flourishing as an independent organism (not to allude to the liberation of ova which may happen to be present)." It seems very necessary to remember that there is a surface as well as a bottom fauna, and that while we may bewail the action of the trawler on the latter, we must not overlook the action of screw-propellers, which must kill myriads of young, and destroy countless floating eggs. After all, our knowledge of even some of our common food-fishes is very incomplete. "Why should we not be in a position to say, in this nineteenth century, that a fish, say, the Haddock, extends in great numbers from either hemisphere into the Atlantic, and, if so, whether the pigmy belt of the three-mile or even the thirteen-mile limit can have any more influence on this form than on the ever-abundant Herring?" In this able defence of the "trawl," we may realize what a destructive, though not altogether exterminative agent it is; but beyond this the book is a welcome addition to a knowledge of the inhabitants of that most romantic and little-known region which we call the Sea.

Des Hybrides a l'état sauvage. Règne Animal. (Classe des Oiseaux). Par André Suchetet. Lille: Bigot Frères.

Hybridity is a problem which lies at the root of a philosophical conception of the much-used and much-vexed term "species." We all agree that the various breeds of Fowls and Pigeons represent but one species, because we know their life-histories. But we describe new forms of animals received from abroad as species on the canon of what is understood as "specific differences." Hence philosophically we are wrong, and systematically we are right, and the same practice and a similar rule are employed by naturalists throughout the animal kingdom. Even mankind have afforded the same problem, and from France also came a suggestive little book by Dr. Paul Broca, which was translated and published in London in 1864 under the title of 'On the Phenomena of Hybridity in the Genus Homo.'

Mons. Suchetet has undertaken a great work, and if succeeding volumes are allied in size to this one devoted to birds, a colossal publication on the subject is assured. The limitations attached to the term "species" are apparent when our author remarks:—"Nous avons substitué les mots '*formes animales*' aux mots '*espèces animales*,' parce que notre embarras a été grand lorsqu'il s'est agi de distinguer entre l'espèce et la race (ou, pour mieux dire, entre l'espèce et la *sous-espèce* comme on fait emploi de ce mot en zoologie)." The introduction occupies no fewer than 118 pages, and is a valuable summary of most that has been written on the subject. In the "Liste des Musées Publics et des Collections Particulières dont les Directeurs ou les Propriétaires ont été assez gracieux pour nous envoyer en communication," we notice seventy-eight entries, the cosmopolitan character of which prove that the material has been widely sought; while the "Liste

Alphabétique des Personnes avec lesquelles nous avons correspondu au sujet des Hybrides" is a most representative one, including many of our own contributors, some under a new appellation, as, for example, the Curator of the Leicester Museum, who appears as "pasteur à Rotterdam (Hollande)."

Neither time, trouble, nor expense has evidently been withheld in the production of this book, which incorporates a large amount of scattered information in a systematic and judicial manner, and will for a long time prove a recognized reference to a most important factor in zoological philosophy.

A Dictionary of Bird Notes, to which is appended a Glossary of Popular, Local, and Old-fashioned Synonyms of British Birds. By CHAS. LOUIS HETT. Jacksons', Market Place, Brigg.

IN these pages (1897, p. 535) we published an announcement by Mr. Hett that he was preparing a Dictionary of the Call-notes of British Birds, and we have now received a tasteful and inexpensive book—interleaved for the record of observations by the reader—which may well find a place in the ornithological library. The method pursued is as follows:—Firstly, under "Note-Bird" an alphabetical list of the notes, with the name of the avian vocalist attached, is given, and then, under "Bird-Note," the arrangement is reversed. Easy reference is thus afforded, and the equivalents of the sounds themselves will and must be judged by specialists in the appreciation and interpretation of bird-notes. The Glossary of Popular, Local, and Old-fashioned Names of British Birds is a most excellent and useful compilation, which should prevent many errors on the part of too hasty transcribers of observations, and prove a boon to puzzled readers of local notes. A List is given of the 376 Birds accepted as British by the Committee of the British Ornithologists' Union in 1883, and also of the "Terms applied to Wild Fowl," as, for example, "RUFF. '*a hill of*,' several."

EDITORIAL GLEANINGS.

We have received the Annual Report and Transactions of the "North Staffordshire Field Club" for 1897–98. In Sectional Reports, and under Zoology, Mr. Masefield reports as follows:—"It is frequently said by our landowners who are Fox-hunters that Badgers kill or drive away Foxes. Now the Badger still survives in our county, as is shown by the frequent reports I receive from different localities of Badgers having been observed, dug out, or shot, and therefore I am glad to be able to state, on the authority of Mr. Heinman, of Porlock, who has had exceptional opportunity of studying the ways of Badgers, that equally in Devonshire, Somersetshire, and Northamptonshire he 'has constantly found full-grown Foxes and Badgers dwelling together in unity.' This statement will, I trust, dispel the fears of Fox-hunters for ever, and should cause them to extend 'neutrality,' at all events, to our local Badgers in future."

We are all cognisant that light attracts fishes as well as many other animals. We have been much interested in the accounts of the new French naval destroyer 'Gustave Zédé.' Anything more unlikely to produce a zoological observation than this proposed navy annihilator is difficult to imagine. Still, the unexpected always happens. We learn that the destructive powers of this new terror are limited, not alone by naval science, but by natural causes, and by fish. "As for the telescopic mirror arrangement which was to enable her to direct her course from under water, it failed, not for one but for several reasons; while her 'electric eye,' or searchlight, so far from enabling her to see anything ahead of her through the water, rather rendered the sea ahead more opaque, as it attracted shoals of fish, which hovered round the brilliant disc, like moths round a candle."—*Westminster Gazette.*

At a meeting of the Zoological Society of London, held on Feb. 7th, Mr. G. E. H. Barrett-Hamilton read a paper on the Mice of St. Kilda, of which he recognized two species—*Mus hirtensis*, sp. nov., a representative of *M. sylvaticus*, and *M. muralis*, sp. nov., representing *M. musculus*. Both of these species showed good distinctive characters from their well-known prototypes.

At at similar meeting, on March 7th, Mr. W. E. de Winton exhibited and made remarks upon the tail of a Common Fox (*Canis vulpes*), showing the gland on the upper surface covered with straight coarse hair, the existence of which appeared to be little known.

THE Annual Meeting of the Society for the Protection of Birds was held on Feb. 28th, Sir Edward Grey, M.P., in the chair. The Report, which was presented by Mr. Sharpe, chairman of the executive committee, stated that the total number of members is now over 20,000, and the branches number 152. The Society still continued its campaign against the wearing of Ospreys, but without apparently much effect, as in 1898 nearly 35,000 Birds of Paradise and 2200 packages of Osprey plumes were sold in six days at auction. With regard to Ospreys worn by the officers of certain regiments, a promise had been given by Mr. Brodrick that an effort will be made to find a substitute. Sir Edward Grey, in moving the adoption of the Report, said the Society had done much to awaken public opinion to the need of checking the wanton destruction of bird-life. But a wholesale destruction of foreign birds in the breeding season still went on, with a view to supplying ornaments for hats, which would necessarily lead to the extinction of certain species. People did not realize this. Considerable power had been given to county councils to protect bird-life, and they had responded very well, and in most cases had passed very satisfactory bye-laws. But the real difficulty was the enforcement of these rules.

WE have received from the "Humanitarian League" a tractate on "The Cost of a Seal-skin Cloak," by Joseph Collinson. He who reads may literally sup on horrors as the callous destruction of these animals is detailed. Allowing, however, for all exuberant animal sympathy, and offending no "philistine" with the introduction of a new "fad," we must agree with much that is here written. The writer pithily remarks:—"It is a remarkable fact that during the whole of the time that the Anglo-American controversy raged over the Behring Straits Seal question, not one word should have been said on behalf of the Seals themselves. The flood of talk swept on; there was a great deal said about 'rights'—every right, indeed, was abundantly discussed except the right of the Seals, if not to live their lives in their own way, at least to humane treatment when the time comes round to kill them. The horrible tortures inflicted on these helpless animals to provide mankind with Seal-skin were treated as if they were entirely immaterial."

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